L Number	Hits	Search Text	DB	Time stamp
1	28127	(laser or halogen or Xe) same (silicon or polysilicon)	USPAT; US-PGPUB	2003/04/14 15:11
2	3132	(((laser or halogen or Xe) same (silicon or polysilicon)) and (tft or (thin adj film adj transistor)))	USPAT; US-PGPUB	2003/04/14 15:11
3	259	(((laser or halogen or Xe) same (silicon or polysilicon)) and (tft or (thin adj film adj transistor))) and @ad<=19930712	USPAT; US-PGPUB	2003/04/14 15:14
4	13427	(laser or halogen or Xe) same (silicon or polysilicon)	EPO; JPO; DERWENT; IBM_TDB	2003/04/14 15:11
5	1019	((laser or halogen or Xe) same (silicon or polysilicon)) and (tft or (thin adj film adj transistor))	EPO; JPO; DERWENT; IBM_TDB	2003/04/14 15:12
9	374	(((laser or halogen or Xe) same (silicon or polysilicon)) and (tft or (thin adj film adj transistor))) and ((irradiating or irradiation) same (laser or halogen or Xe))	EPO; JPO; DERWENT; IBM_TDB	2003/04/14 15:31
11	737	438/149-152,166,486,487.ccls. and (irradiating or irradiation)	USPAT; US-PGPUB	2003/04/14 15:37
12	83	438/149-152,166,486,487.ccls. and (irradiating or irradiation)) and @ad<=19930712	USPAT; US-PGPUB	2003/04/14 15:40
13	56	438/149-152,166,486,487.ccls. and (irradiating or irradiation)) and @ad<=19930712 not (((laser or halogen or Xe) same (silicon or polysilicon)) and (tft or (thin adj film adj transistor))) and @ad=19930712)	USPAT; US-PGPUB	2003/04/14 15:34
14	337	257/72,74,75.ccls. and (irradiating or irradiation)	USPAT; US-PGPUB	2003/04/14 15:40
15	35	(257/72,74,75.ccls. and (irradiating or irradiation)) and @ad<=19930712	USPAT; US-PGPUB	2003/04/14 15:40
16	29	((257/72,74,75.ccls. and (irradiating or irradiation)) and @ad<=19930712) not ((438/149-152,166,486,487.ccls. and (irradiating or irradiation)) and @ad<=19930712) not (((laser or halogen or Xe) same (silicon or polysilicon)) and (tft or (thin adj film adj transistor))) and @ad<=19930712))	USPAT; US-PGPUB	2003/04/14 15:40
18	24	(((257/72,74,75.ccls. and (irradiating or irradiation)) and @ad<=19930712) not ((438/149-152,166,486,487.ccls. and (irradiating or irradiation)) and @ad<=19930712) not (((laser or halogen or Xe) same (silicon or polysilicon)) and (tft or (thin adj film adj transistor))) and @ad<=19930712)) not (((laser or halogen or Xe) same (silicon or polysilicon)) and (tft or (thin adj film adj transistor))) and @ad<=19930712)	USPAT; US-PGPUB	2003/04/14 15:41

PAT-NO: JP405055570A

DOCUMENT-IDENTIFIER: JP 05055570 A

TITLE: THIN FILM SEMICONDUCTOR DEVICE AND MANUFACTURE THEREOF

PUBN-DATE: March 5, 1993

INVENTOR-INFORMATION:
NAME
OIKAWA, SABURO
MOCHIZUKI, YASUHIRO

ASSIGNEE-INFORMATION:
NAME COUNTRY
HITACHI LTD N/A

APPL-NO: JP03218690

APPL-DATE: August 29, 1991

INT-CL (IPC): H01L029/784, G02F001/136 , H01L027/12

ABSTRACT:

PURPOSE: To provide uniformity and reproducibility of a product by providing a thin field-effect film transistor having a first reverse staggered structure formed with an amorphous semiconductor layer channel region of a single layer and a second reverse staggered structure formed with a semiconductor layer channel region of a laminated layer of crystalline and amorphous layers.

CONSTITUTION: A Cr layer is deposited on an insulting board 1, and a gate

electrode 2 is formed. An SiN layer 3 to become a gate insulating layer and an amorphous Si layer 4 of a semiconductor film are sequentially deposited. The layer 4 is deposited by using SiH<SB>4</SB> and H<SB>2</SB> as material gases. Hydrogen concentration in the layer 4 is set to 10% or less. The layer 4 is modified to a polycrystalline Si layer 5 by **irradiating with a laser**. An amorphous Si layer 6 and an n-type Si layer 7 doped with phosphorus are sequentially deposited. A **thin film transistor** for a peripheral circuit is formed of a laminated structure of the layers 5 and 6 at the channel region of a thin **silicon** film transistor, and a **thin film transistor** for driving a pixel is formed in a single layer structure of the layer 6.

PAT-NO: JP404139727A

DOCUMENT-IDENTIFIER: JP 04139727 A

TITLE: **THIN FILM TRANSISTOR** AND MANUFACTURE THEREOF

PUBN-DATE: May 13, 1992

INVENTOR-INFORMATION:
NAME
MATSUMOTO, SATOSHI
YAMAGUCHI, NORITOSHI

ASSIGNEE-INFORMATION:
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KYOCERA CORP N/A

APPL-NO: JP02262361

APPL-DATE: September 29, 1990

INT-CL (IPC): H01L021/336, H01L021/22 , H01L029/784

US-CL-CURRENT: 438/FOR.184

ABSTRACT:

PURPOSE: To form a p-n junction having a good characteristic at a low temperature as a source-drain area without producing cracks in a **silicon** film by performing **laser** doping by setting the thickness of a the first insulating film to the double or thicker than that of a **silicon** film.

CONSTITUTION: The first insulating film 2 and a non-single crystal **silicon** film 3 are successively formed on an insulating substrate

1. The thickness of the film 3 is set to about 1/2 of the film 2. The second insulating film 4 is formed on the film 3. After the film 3 is crystallized or recrystallized by **irradiating** the film 3 with **laser** light L, the surface sections of the films 4 and 3 are removed by etching. Then a gate insulating film 5 is formed on the film 3 and a gate electrode 6 is formed on the film 5. In addition, contact holes 5a and 5b for forming source area/drain area are provided on both sides of the film 5 and diffusion layers 7 and 8 are respectively formed in the hole sections 5a and 5b by doping. Then a source and drain electrodes 9 and 10 are respectively formed on the source and drain areas 7 and 8. Finally, a protective film 11 is formed by leaving parts of the electrodes 6, 9, and 10 uncovered with the film 11.

PAT-NO: JP404051529A

DOCUMENT-IDENTIFIER: JP 04051529 A

TITLE: MANUFACTURE OF **THIN FILM TRANSISTOR**

PUBN-DATE: February 20, 1992

INVENTOR-INFORMATION:
NAME
KONYA, NAOHIRO

ASSIGNEE-INFORMATION:
NAME COUNTRY
CASIO COMPUT CO LTD N/A

APPL-NO: JP02159847

APPL-DATE: June 20, 1990

INT-CL (IPC): H01L021/336, H01L029/784

US-CL-CURRENT: 257/66, 438/512 , 438/FOR.151

ABSTRACT:

PURPOSE: To manufacture a **thin film transistor** having uniform characteristics by preparing source and drain electrodes on an insulating substrate, followed by depositing an amorphous **silicon** semiconductor and gate insulating film sequentially thereon, further followed by **irradiating laser** beam downward to the gate insulating film to polymerize the amorphous **silicon** semiconductor.

CONSTITUTION: On an insulating substrate 1, a source

electrode 2, a drain
electrode 3, and an ohmic contact layer 4 consisting of n-type amorphous
silicon are prepared, and further i-type amorphous **silicon** semiconductor 5a and
gate insulating film 6 thereon in this order. Next, excimer **laser** beam A is
irradiated downward to the gate insulating film 6 to heat both a semiconductor
layer 5 and the ohmic contact layer 4 which is under the semiconductor layer 5,
and after that, they are gradually cooled to polymerize the amorphous **silicon**
semiconductor 5a to prepare a **polysilicon** semiconductor 5b, while at the same
time the amorphous **silicon** of the ohmic contact layer 4 is also polymerized to
prepare **polysilicon**.

PAT-NO: JP402219274A

DOCUMENT-IDENTIFIER: JP 02219274 A

TITLE: **THIN-FILM TRANSISTOR**

PUBN-DATE: August 31, 1990

INVENTOR-INFORMATION:
NAME
FUKADA, TAKESHI
SHINOHARA, HISATO

ASSIGNEE-INFORMATION:

NAME	COUNTRY
SEMICONDUCTOR ENERGY LAB CO LTD	N/A

APPL-NO: JP01040596

APPL-DATE: February 20, 1989

INT-CL (IPC): H01L029/784, H01L021/336

US-CL-CURRENT: 257/66

ABSTRACT:

PURPOSE: To manufacture a **thin-film transistor(TFT)** which operates at a high speed with high reducibility without complicated process by cutting the part of the **TFT** constituting a source-drain area composed of a low-resistance non-monocrystalline semiconductor layer or the semiconductor layer and a metal with a condensed laser beam.

CONSTITUTION: A non-monocrystalline **silicon** film 2 which is formed on a soda

line glass plate 1 as a low-resistance non-monocrystalline semiconductor and
subjected to dry etching is cut into a source area 3 and drain area 4 by
irradiating the film 2 with an excimer **laser** beam condensed by an optical
system so that the beam can form a beam spot of ≤10μm in width on the
surface to be irradiated. Then an I type
non-monocrystalline **silicon** film 6 is
formed on the source area 3, drain area 4, and cut section 5 as a high-
resistance semiconductor layer and a **silicon** nitride film 7 is formed on the
surface of the film 6 as a gate insulating film. Then, after patterning the
films to a prescribed pattern, a gate electrode 8 is formed by depositing a
molybdenum film. Therefore, a **TFT** having a short channel length can be
manufactured easily.

PAT-NO: JP402033935A

DOCUMENT-IDENTIFIER: JP 02033935 A

TITLE: MANUFACTURE OF **THIN FILM TRANSISTOR**

PUBN-DATE: February 5, 1990

INVENTOR-INFORMATION:
NAME
YAZAKI, MASATOSHI

ASSIGNEE-INFORMATION:
NAME COUNTRY
SEIKO EPSON CORP N/A

APPL-NO: JP63183803

APPL-DATE: July 23, 1988

INT-CL (IPC): H01L021/336, G02F001/136 , H01L027/12 , H01L029/784

US-CL-CURRENT: 117/43, 438/662 , 438/FOR.333 , 438/FOR.334

ABSTRACT:

PURPOSE: To prevent the deterioration and the contamination of a semiconductor layer produced in processes and simultaneously contrive large grain diameter by utilizing a gate insulating film as a thermal holding film at the time of **laser irradiation** while utilizing it as a protecting film of the semiconductor layer in the processes.

CONSTITUTION: A **silicon** layer 2 is laminated on an insulation board 1. Next

the **silicon** layer 2 is left in the form of an island and further an amorphous
silicon layer 3 and an insulating film 4 are successively produced. Next a
recess part is formed on the surface of the insulating layer 4 and the thick
film part and the thin film part of the insulating film 4 are formed. Next
laser irradiation is performed and the amorphous **silicon** layer 3 is converted
into multicrystal **silicon** 5. Next a low resistance **silicon** layer 6 which
becomes a gate electrode of a **thin film transistor** is formed. Next the part
except for the thin film part of the insulating film 4 is removed. The
insulating film 4 of theleft thin film part becomes a gate insulating film of
the **thin film transistor**. Thus, the insulating film 4 plays a role of a
protecting film of thermal energy at the time of **laser irradiation**, works as
the protecting film of the amorphous **silicon** layer 3 and the multicrystal
silicon layer 5 and becomes a gate insulating film after complection.

DERWENT-ACC-NO: 1992-410252

DERWENT-WEEK: 199250

TITLE: **Thin film transistor** mfr. for active matrix type liq. crystal display - including coating **silicon**@ and insulation films, then **irradiating with laser** beam to crystallise polycrystalline **silicon**@ layer NoAbstract

---------- KWIC ---------

Thin film transistor mfr. for active matrix type liq. crystal display - including coating **silicon**@ and insulation films, then **irradiating with laser** beam to crystallise polycrystalline **silicon**@ layer NoAbstract

THIN FILM TRANSISTOR MANUFACTURE ACTIVE MATRIX TYPE LIQUID CRYSTAL DISPLAY COATING **SILICON**@ INSULATE FILM IRRADIATE **LASER** BEAM CRYSTAL POLYCRYSTALLINE **SILICON**@ LAYER NOABSTRACT

US-PAT-NO: 5262350

DOCUMENT-IDENTIFIER: US 5262350 A

TITLE: Forming a non single crystal semiconductor layer by
using an electric current

---------- KWIC ---------

Then, a power source 11 is connected at one end with alternate ones of the
conductive layers 4 and at the other end with intermediate ones of them;
accordingly, the power source 11 is connected across the conductive layers 3
and 9. At this time, the region Z2 of the non-single crystal semiconductor
layer 7, except the outer peripheral region Z1 thereof, is exposed to high L
from the side of the light-permeable substrate 2 through the light-permeable
conductive layer 3 and insulating layer 6 by the application of light L,
electron-hole pairs are created in the non-single crystal semiconductor 7 to
increase its conductivity. Accordingly, the **irradiation** by light L during the
application of the current I to the non-single crystal semiconductor 7
facilitates a sufficient supply of the current I to the region Z2 even if the
non-single crystal semiconductor 7 has a low degree of conductivity or
conductivity close to intrinsic conductivity. For the **irradiation** of the
non-single crystal semiconductor 7, a xeron lamp, fluorescent lamp and
sunlight, can be employed. According to an experiment, good results were
obtained by the employment of a 10.sup.3 -lux xenon lamp. In the region Z2 a
semi-amorphous semiconductor S2 is formed, as depicted in

FIG. 1G. The mechanism by which the semi-amorphous semiconductor S2 is formed in the region S2 is that heat is generated by the current I in the region S2, by which it is changed in terms of structure.

Further, it has been found that the abovementioned heat generation contributes to the formation of the semi-amorphous semiconductor S2 which exhibits an excellent electrical conductivity characteristic. FIG. 3 shows this electrical conductivity characteristic, the abscissa representing temperature 100/T (.degree.K..sup.-1) and the ordinate dark current log .sigma. (.sigma.:.sigma. cm.sup.-1). According to our experiments, in which when the non-single crystal semiconductor 7 had a characteristic indicated by the curve a1, the currents having densities of 3.times.10.sup.1 and 1.times.10.sup.3 A/cm.sup.2 were each applied as the aforesaid current I for 0.5 sec. while **irradiating** by the light L at an illumination of 10.sup.4 LX, such characteristics as indicated by the curves a2 and a3 were obtained, respectively. In the case where when the non-single crystal semi-conductor 7 had such a characteristic as indicated by the curve b1, the currents of the same values as mentioned above were each applied as the current I for the same period of time under the same illumination condition, a characteristics indicated by the curves b2 and b3 were obtained, respectively. The curve b1 shows the characteristic of a non-single crystal semiconductor obtained by adding 1.2 mol % of the aforementioned metallic impurity, such as Ga or In, Sn or Pb, or As or Sb, to the non-single crystal semiconductor 7 of the characteristic indicated by the curve a1. As is evident from a comparison of

the curves a2, a3 and b2, b3, a semi-amorphous semiconductor obtained by adding the abovesaid metallic impurity to the semi-amorphous semiconductor S2 exhibits an excellent conductivity characteristic over the latter with such a metallic impurity added. It is preferred that the amount of metallic impurity added to the semi-amorphous semiconductor S2 be 0.1 to 10 mol %.

Thereafter, the non-single crystal semiconductor layer 84 is exposed to **irradiation** by laser light, with a power source 86 connected across the conductive layers 83 and 85, as illustrated in FIG. 7E. In this case, a laser beam L' having a diameter of 0.3 to 3 .mu.m, for instance, is applied to the non-single crystal semiconductor layer 84 at selected ones of successive positions a.sub.1, a.sub.2, . . . thereon, for example, a.sub.1, a.sub.3, a.sub.4, a.sub.8, a.sub.9, at the moments t.sub.1, t.sub.3, t.sub.4, t.sub.8, t.sub.9, . . . in a sequential order, as depicted in FIG. 8. By this **irradiation** the conductivity of the non-single crystal semiconductor layer 84 is increased at the positions a.sub.1, a.sub.3, a.sub.4, a.sub.8, a.sub.9, . . . to flow there currents I.sub.1, I.sub.3, I.sub.4, I.sub.8, I.sub.9, . . . , thus generating heat. As a result of this, the non-single crystal semiconductor layer 84 undergoes a structural change at the positions a.sub.1, a.sub.3, a.sub.4, a.sub.8, a.sub.9, . . . to provide semi-amorphous semiconductor regions K.sub.1, K.sub.3, K.sub.4, K.sub.8, K.sub.9, . . . , as shown in FIG. 7F.

The semiconductor device shown in FIG. 7F can be regarded as a memory in which "1", "0", "1", "1", "0", . . . in the binary representation are stored at the positions a.sub.1, a.sub.2, a.sub.3, a.sub.4,

a.sub.5, . . . ,
respectively. When the regions K.sub.1, K.sub.3, K.sub.4, . . . and
consequently the positions a.sub.1, a.sub.3, a.sub.4, . . . are irradiated by
a laser beam of lower intensity than the aforesaid one L' while at the same
time connecting the power source across the conductive layers 33 and 35 via a
load, the regions K.sub.1, K.sub.3, K.sub.4, . . . become more conductive to
apply a high current to the load. Even if the regions K.sub.2, K.sub.5,
K.sub.6, . . . are irradiated by such low-intensity laser beam, however, no
current flows in the load, or if any current flows therein, it is very small.
Accordingly, by **irradiating** the positions a.sub.1, a.sub.2, a.sub.3, . . . by
low-intensity light successively at the moments t.sub.1, t.sub.2, t.sub.3, . .
. , outputs corresponding to "1", "0", "1", "1", . . . are sequentially
obtained in the load, as shown in FIG. 9. In other words, the semiconductor
device of this embodiment has the function of a read only memory.

438/166

	U	1 [1]	Document ID	Issue Date	Pages	Title	Current OR
1	☐	☒	JP 09055370 A	19970305	6	THIN FILM SEMICONDUCTOR DEVICE AND MANUFACTURE THEREOF	
2	☐	☐	JP 09139717 A	19970513	6	THIN FILM TRANSISTOR AND MANUFACTURE THEREOF	
3	☐	☐	JP 09321289 A	19971220	4	MANUFACTURE OF THIN FILM TRANSISTOR	
4	☐	☐	JP 10209174 A	19980831	6	THIN-FILM TRANSISTOR	
5	☐	☒	JP 11031835 A	19990205	4	MANUFACTURE OF THIN FILM TRANSISTOR	
6	☐	☒	JP 04369040 A	19921028	9	Thin film transistor mfr. for active matrix type liq. crystal display - including coating silicon@ and insulation films, then irradiating with laser beam to crystallise polycrystalline silicon@ layer NoAbstract	

	Current XRef	Retrieval Classif	Inventor	S	C	P	2	3	4	5	Image Doc. Displayed	PT
1			OIKAWA, SABURO et al.	☒	☐	☐	☐	☐	☐	☐	JP 05055570 A	☐
2	438/FOR.184		MATSUMOTO, SATOSHI et al.	☒	☐	☐	☐	☐	☐	☐	JP 04139727 A	☐
3	257/66; 438/512; 438/FOR.151		KOUTA, NAOHIRO	☒	☐	☐	☐	☐	☐	☐	JP 04051529 A	☐
4	257/66		FUKADA, TAKESHI et al.	☒	☐	☐	☐	☐	☐	☐	JP 02219274 A	☐
5	117/43; 438/662; 438/FOR.333; 438/FOR.334		YASAKI, MASATOSHI	☒	☐	☐	☐	☐	☐	☐	JP 02033935 A	☐
6				☒	☐	☐	☐	☐	☐	☐	JP 04305940 A	☐

	U	1 [1]	Document ID	Issue Date	Pages	Title	Current OR
1	☐	☐	US 6235563 B1	20010522	21	Semiconductor device and method of manufacturing the same	438/166
2	☐	☐	US 5894151 A	19990413	25	Semiconductor device having reduced leakage current	257/347
3	☐	☐	US 5716857 A	19980210	29	Method for manufacturing a semiconductor device	438/151
4	☐	☐	US 5485019 A	19960116	38	Semiconductor device and method for forming the same	257/57
5	☐	☒	US 5470762 A	19951128	13	Method of fabricating a thin film transistor	438/164
6	☐	☒	US 5424244 A	19950613	23	Process for laser processing and apparatus for use in the same	438/301
7	☐	☒	US 5395804 A	19950307	12	Method for fabricating a thin film transistor	438/166

	Current XRef	Retrieval Classif	Inventor	S	C	P	2	3	4	5	Image Doc. Displayed	PT
1	257/E21.133; 257/E21.413; 257/E29.151; 257/E29.293; 438/485; 438/486		Oka, Hideaki et al.	☐	☐	☐	☐	☐	☐	☐	US 6 [illegible]	☐
2	257/349; 257/E21.605; 257/E21.703; 257/E27.112		Yamazaki, Shunpei et al.	☒	☐	☐	☐	☐	☐	☐	US 5894151	☐
3	257/E21.133; 257/E21.413; 257/E21.703; 65/60.8		Zhang, Hongyong	☐	☐	☐	☐	☐	☐	☐	US 5 [illegible]	☐
4	257/59; 257/E21.413; 257/E21.703; 257/E27.111; 257/E29.151; 257/E29.277		Yamazaki, Shunpei et al.	☒	☐	☐	☐	☐	☐	☐	US 5485019	☐
5	257/E21.413; 438/703; 438/704; 438/739; 438/978		Codama, Mitsufumi et al.	☒	☐	☐	☐	☐	☐	☐	US 5470762	☐
6	257/E21.141; 257/E21.413; 438/585		Zhang, Hongyong et al.	☒	☐	☐	☐	☐	☐	☐	US 5424244	☐
7	257/E21.133; 257/E21.413; 257/E21.414; 438/486; 438/909		Ueda, Tohru	☒	☐	☐	☐	☐	☐	☐	US 5395804	☐

	U	1 [1]	Document ID	Issue Date	Pages	Title	Current OR
8	☐	☒	US 5313075 A	19940517	26	Thin-film transistor	257/57
9	☐	☒	US 5254208 A	19931019	28	Method for manufacturing a semiconductor device	438/479
10	☐	☒	US 5177578 A	19930105	12	Polycrystalline silicon thin film and transistor using the same	257/64
11	☐	☒	US 5132754 A	19920721	17	Thin film silicon semiconductor device and process for producing thereof	257/57

	Current XRef	Retrieval Classif	Inventor	S	C	P	2	3	4	5	Image Doc. Displayed	PT
8	257/66; 257/E21.413; 257/E21.703; 257/E29.151; 349/122; 349/138; 349/43		Chang, Hongyong et al.	☒	☐	☐	☐	☐	☐	☐	US 6313475	☐
9	117/8; 117/930; 257/E21.133; 257/E21.413; 257/E21.703; 438/166; 438/486; 438/938		Chang, Hongyong	☒	☐	☐	☐	☐	☐	☐	US 6194290	☐
10	257/72; 257/E21.101; 257/E21.413; 257/E29.004; 257/E29.293		Kakinoki, Hisashi et al.	☒	☐	☐	☐	☐	☐	☐	US 5177578	☐
11	257/E21.101; 257/E29.003; 257/E29.293		Serikawa, Tadashi et al.	☒	☐	☐	☐	☐	☐	☐	US 5132754	☐